Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems	)	PR Docket No. 93-61 RM-8013

To: The Commission

FURTHER COMMENTS OF MOBILEVISION, L.P.

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EXECUTIVE SUMMARY

LMS (formerly "AVM") systems comprise a family of exciting, innovative, spectrum-efficient services vitally important to the realization of national goals for implementation of an Intelligent Vehicle Highway System ("IVHS") and for a safer, more secure, more productive tomorrow. Offering the capability of accurately locating and communicating with objects, vehicles or persons, at an affordable price, LMS services now fully developed and currently deployed or ready for immediate deployment nationwide are the embodiment of innovation and technology at work for the common good.

Within the family of LMS services, wideband, pulse ranging multilateration systems bring to the marketplace new, highly-efficient, wide area, IVHS-related location and communication networks to enhance safety, security and business productivity, in competition with alternative wireless communication and location systems and technologies. Under the Interim Rules adopted by the Commission in 1974, MobileVision, L.P. has developed the most versatile, cost-effective wideband location monitoring system available today, and with a capital infusion that is imminent, will deploy its licensed system nationwide.

The infrastructure costs for wideband LMS systems are massive. To attract support from the capital markets adequate to bring such service to the consumer and commercial marketplace, the services offered must fully meet the public's needs and demands. Extensive market research and experience conclusively demonstrate the nature and extent of those service requirements. Moreover, economic viability depends fundamentally on providing the services the public demands. Only then, with assurance that systems will grow, prosper and remain economically viable, does investment follow,

enabling entrepreneurs such as MobileVision to build their systems and the public to benefit broadly from the services provided.

In its previous submissions in this proceeding, MobileVision has described the basic needs that the public -- both consumer and commercial -- has stated wideband LMS providers must meet: Reliability of service, accuracy in the location function, ancillary voice and data services, and low cost. Market studies clearly indicated minimal market penetration without ancillary voice and data capability. Prospective national accounts customers (automobile manufacturers and national automobile clubs, for example) have been clear and unanimous in setting a requirement for voice availability. Market studies for commercial services show less than adequate market penetration where voice and data messaging capability is absent.

MobileVision has also reiterated in its submissions the system requirements from a technological perspective which wideband LMS providers must have in order to offer the service the market demands: Sufficient bandwidth to ensure adequate capacity (because low cost mandates a mass customer base) and protection from excessive interference (to assure accuracy and reliability). MobileVision believes that the Interim Rules under which currently available wideband systems have been developed are fundamentally sound and adequate in meeting the first of these requirements (bandwidth). Indeed the Commission, in the proceeding which resulted 20 years ago in the adoption of the Interim Rules, recognized the needs of wideband systems and, in MobileVision's view, properly provided for adequate spectrum in two 8 MHz bands. MobileVision further believes the Commission at that time intended to accommodate the second technical requirement of protection from objectionable interference by allocating separate segments of the LMS band for the wideband and narrowband systems.

While the NPRM in this proceeding initially set out to adopt permanent rules for LMS, without wholesale revisions, through clarifications and modifications that would ensure that LMS would achieve its maximum capability in helping to meet the national goals for IVHS, the record has become muddled, confused, and fraught with conflicting claims and proposals. Some of those proposals, in suggesting (1) that the spectrum should be shared through time slicing or other sharing protocols which result in loss of capacity, accuracy, required ancillary services and reliability; (2) that the wideband spectrum should be fragmented into smaller bands, so that viable location systems could exist only in conjunction with cellular, SMR or other mobile communications services as a supplemental offering by the providers of such services; or (3) that the spectrum be reallocated as Teletrac now proposes with one 10 MHz band centered in that portion of the spectrum where it is currently authorized and operating its wideband LMS service, threaten, each in its own way, to restrain competition, foster monopoly and will render wideband LMS systems technically and economically nonviable.

MobileVision firmly believes that the record fails to support adoption of any rules which depart radically from the Interim Rules. It submits conversely that rules should only be changed when there is a clear and overwhelming demonstration of need to do so. This record does not support those changes. Although MobileVision prefers the band allocation contained in the Interim Rules, the record does raise issues which can be met by modest rule changes which MobileVision believes would accommodate the stated needs of wideband LMS, narrowband LMS and Part 15 users of the 902-928 MHz band. To that end, MobileVision offers the following recommended changes to the Interim Rules:

- to provide a safe haven for Part 15 users in the 902-928 MHz band and to meet the requirements of narrowband LMS providers, a contiguous 10 MHz band should be created at 910-920 MHz for narrowband LMS services and

Part 15 devices, while continuing the secondary use by Part 15 users of the two 8 MHz bands used by wideband LMS providers;

- to assure sufficient accuracy and capacity for wideband LMS systems to survive in the marketplace, the LMS spectrum should be reallocated for wideband use at the edges of the band by creating two 8 MHz bands at 902-910 MHz and 920-928 MHz;
- to effectively manage interference within the wideband segments, permanent rules should provide that the first licensee to build is afforded interference protection, but not exclusivity (i.e. that the second provider must demonstrate that its system will not interfere with any previously constructed system); and
- if deemed necessary to foster robust competition in location and monitoring services, though MobileVision believes that such competition is already present, each wideband system provider in a market should be required to resell system capacity to a maximum of two competitors under conditions that will insure the integrity of the service.

These modest revisions to the Interim Rules, in conjunction with related minor modifications relating to the forward link, out of band emissions, interference tolerance standards and including requirements that wideband providers defray the costs incurred in migrating existing Part 15 users out of the wideband segments in those rare instances where their operations cause interference that cannot be resolved in any other way, should meet the stated needs of wideband, narrowband and Part 15 users as expressed thus far in this proceeding, without causing singular disadvantages to any of them. Therefore, MobileVision urges the Commission to adopt permanent rules for LMS in conformance with these proposals.

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To: The Commission

FURTHER COMMENTS OF MOBILEVISION, L.P.

MobileVision, L.P. ("MobileVision"), by its attorneys, hereby submits Further Comments in response to the Commission's Public Notice of February 9, 1994, soliciting additional comments in this proceeding on issues raised in ex parte submissions made by PacTel Teletrac ("Teletrac") on January 26, 1994 ("Teletrac Submission") and by Southwestern Bell Mobile Systems, Inc. ("Southwestern Bell" or "SBMS") on February 2, 1994 and on February 7, 1994 (collectively "SBMS Submissions").[1]

Each of these submissions sets forth new proposals or offers additional material asserting to support previously submitted proposals. None of them correctly addresses the requirements essential if LMS systems are to serve the consumer and commercial marketplaces and advance the introduction of intelligent vehicle highway

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1 MobileVision also comments herein on ex parte submissions made by Pinpoint Communications, Inc. ("Pinpoint") on January 24, 1994 ("Pinpoint Submission") and Amtech Corporation ("Amtech") on February 2, 1994 ("Amtech Submission").

systems ("IVHS"). (The needs for IVHS are succinctly described in Annex 1 hereto and discussed on pages 17-19, infra.)

MobileVision's earlier comments and submissions have addressed the needs for LMS systems -- (a) the allocation of separate sub-bands for wideband and narrowband systems, (b) two 8 MHz bands licensed to pulse-ranging spread spectrum providers, and (c) the assurance that providers can fully support IVHS requirements and market demands for ancillary voice and data services. Rules that accommodate these requirements will result in strong, economically viable systems that will compete with other location related technologies for customer allegiance.

To that end, MobileVision submits that the essential framework of the Interim Rules need not be radically revised. These Interim Rules have served well during the development of LMS for twenty years, and the pioneering designers of LMS systems relied upon them in investing capital to develop their systems. During the period, technological advances have fostered the development of cost effective and miniaturized components that now permit the deployment of these systems on an economic basis sufficient to serve mass market needs. Modest changes to the Interim Rules will suffice to permit that deployment as long as they recognize the need for clear interference protection and clarify permissible services assuring economic viability consonant with marketplace needs and IVHS goals.

While MobileVision prefers the band allocations provided under the Interim Rules and has designed its system to those specifications, it submits the following changes to the rules proposed in the NPRM in lieu of the submissions recently received by the Commission. These changes are designed to address the concerns expressed by the numerous wideband, narrowband and Part 15 commenters in this proceeding without

destroying or reducing the service potential of any technology currently deployed or in development by any of them. Specifically, MobileVision urges the Commission to:

1. Reallocate the spectrum for wideband spread spectrum LMS providers to 902-910 MHz and 920-928 MHz and provide protection on such spectrum to the first licensee to build on each such band as set forth in these Further Comments. This reallocation should be expressly conditioned on the adoption of changes to the forward link allocations and the adherence to strict out of band emission limits in adjacent frequency bands as set forth below. Otherwise, the operation of LMS systems in the reallocated bands will not be possible.

2. Move the forward link for each wideband provider to the same provider's licensed 8 MHz bandwidth, subject to the grandfathering provisions set forth in these suggested changes, since with the shift of band allocation the current forward links will create intolerable interference.

3. Require strict adherence to out of band emission limits not only within 902-928 MHz band but in connection with users of the frequencies above and below that band.

4. While allowing Part 15 users on a secondary basis in the spectrum reserved for wideband LMS providers (902-910 MHz and 920-928 MHz), provide for narrowband LMS use and Part 15 use in the middle spectrum (910-920 MHz), as well as for any developmental licenses, thus providing for both a contiguous 10 MHz band for the narrowband users, as their comments suggest they need, and a safe haven for those Part 15 users that anticipate interference to or from wideband LMS providers. This allocation is consistent technically with narrowband provider comments regarding their tolerance to interference from Part 15 users.

5. Establish tolerance standards for interference from Part 15 users in the wideband and narrowband allocated spectrum.[2] In those isolated instances where existing Part 15 devices in use would interfere with wideband providers, even after coordination, in the 902-910 MHz and 920-928 MHz bands, require, as necessary, migration to the middle spectrum (910-920 MHz) or other spectrum outside the LMS band. Because such instances of required migration are anticipated to be

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2 For the purpose of reaching a consensus on such standards, MobileVision is attaching a preliminary technical analysis of interference regarding Part 15 that has already been circulated to other wideband providers (See Annex 2 hereto). MobileVision invites input from interested Part 15 users on that analysis and will consider that input and wideband industry comments in a recommendation for standards to be submitted in the reply comments.

minimal, MobileVision submits that wideband providers should be required to defray or absorb reasonable costs of migration to such frequencies where that cost is a hardship to existing Part 15 users existing on the Effective Date of the rules.

6. Permit wideband spread spectrum systems that claim and can demonstrate the ability to share with narrowband and Part 15 users the use of the middle band (910-920 MHz) on a secondary basis.

7. In those markets where system infrastructure has already been deployed or systems are operating on the current bands or with forward links in the other band allocated for wideband systems, the Interim Rules for allocation should be grandfathered until migration to the new sub-bands and forward links can be coordinated by the currently deployed or operating systems but in no event later than two years.

As described herein, these modest changes to the current Interim Rules should satisfy the legitimate concerns of the various participants in this proceeding.[3] The new submissions that resulted in the current Public Notice and the other ex parte submissions submitted since the initial Comments fail to address adequately those concerns and the realities of providing LMS services meeting consumer, commercial and IVHS needs.

° Teletrac, in a 180° reversal of its two year advocacy of "co-channel exclusivity," now claims to support sharing by direct overlay of two wideband systems. It is designed to uniquely accommodate Teletrac's current system and, if adopted, will lead to its monopoly in the marketplace for years to come. By centering its proposal around the frequency on which its own system operates and dividing the band to fit Teletrac's designs, Teletrac makes MobileVision's system unworkable. If adopted, the scheme would render unusable MobileVision's ten years of pioneering effort, $50 million in development effort and $7.5 million in fixed site and mobile equipment designed by MobileVision in reliance on the Interim Rules.

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3 In the event rules consistent with these recommendations are not adopted, provisions should be adopted that permit licensees who have invested in equipment designed and built consistent with the requirements of the Interim Rules to deploy the equipment, on a grandfathered basis, in markets for which they hold current licenses under the provisions of the Interim Rules. Such a limited remedial action will avoid hardship on those who relied on existing rules and assure availability of service in some markets without the public awaiting a period of re-engineering.

- Pinpoint alone has advocated time sharing of the entire allocated spectrum. Its sharing proposal, as such, would preclude the use of voice as an ancillary component of LMS systems and thereby eliminate the viability of such systems in the marketplace. Pinpoint's Submission reports on tests conducted in Washington, D.C., but examination shows that these tests were improperly designed and conducted under conditions not representative of actual urban operating conditions. Pinpoint asserts that narrowband systems, such as Amtech's, can coexist on the same frequencies as wideband systems. The conclusions reached in that report do not stand up to scientific analysis. On detailed analysis, they, in fact, support MobileVision's previously submitted presentations on interference problems between co-channel narrowband and wideband systems. Moreover, the Pinpoint system in compact clusters such as it demonstrated and at the high power levels it proposes to use are likely to be devastating to Part 15 users.

- The report from Virginia Tech commissioned by Southwestern Bell substantiates MobileVision's positions on interference and the lack of feasibility of direct overlay and time sharing proposals. It also supports the need for wideband providers to maintain exclusive control of the frequencies on which they operate. The report is based only on technical literature and lacks the benefit of empirical data and field experience and its conclusions with regard to necessary bandwidth (capacity), chipping rate (reliability and accuracy), and operation of adjacent systems in the same 8 MHz band (interference) are incorrect.

- The Virginia Tech report does not, however, account properly for the operation of the MobileVision system with regard to utilization of its 8 MHz bandwidth. In fact, MobileVision utilizes all 8 MHz for location and ancillary voice and data services, thus making effective use of the total spectrum. Southwestern Bell, or other wireless carriers who could add 4 MHz location services as an adjunct to their cellular or other wireless systems, can preclude competition from the full service wideband LMS providers who have pioneered those services. LMS providers left with stand-alone systems, could not therefore offer the needed ancillary communications services, while at the same time providing accurate location service.

- Part 15 users have become overly concerned with potential interference from wideband LMS providers (other than Pinpoint).[4] Many Part 15

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4 In that regard, Part 15 users submitted an ex parte submission to the Commission on January 13, 1994 ("Why Part 15 Equipment Manufacturers Object to Rules Proposed by PacTel Teletrac...") that MobileVision believes significantly overstates the concerns about interference from and to Part 15 users in relation to LMS (See Annex 3 hereto). MobileVision has attempted to address the legitimate and understandable concerns of the Part 15 community in the proposals made in these comments.

uses are indoors and interference will be negligible and should not cause any concern to Part 15 users. Any Part 15 user would have a safe haven on the middle spectrum as proposed by MobileVision, 910-920 MHz, and could not interfere with or suffer interference from wideband LMS; and where interference is experienced, effective techniques are available to mitigate its effect. As described in the MobileVision proposal, industry tolerance limits should be established and Part 15 users permitted to operate below those thresholds in the 902-910 and 920-928 MHz bands. Where migration from those bands is necessary, wideband providers who are interfered with by existing Part 15 users should defray the reasonable cost of such migration.

The promise of state-of-the-art location systems is enormous. Wideband LMS systems such as MobileVision's offer the public an important array of capabilities directly attuned to the needs of a vast and mobile modern society. The panoply of LMS offerings described below addresses many of the overriding national concerns about crime, law enforcement, personal safety and business productivity, and offers the most cost effective, mass consumer solution to the aims of IVHS. These innovative services are masterful in meeting real world business and consumer needs.

Hardly an individual today has not been touched in some way by events or conditions that have directly affected or threatened the safety and security of their own beings, their homes, family or business. Automobile theft and related automobile burglary alone has the fastest rising crime incidence in the United States and has reached levels of national concern. LMS services are among the most versatile and innovative, yet affordable, to emerge on the communications scene, in a era full of precedent-setting technological developments. Properly configured to meet the needs they are capable of addressing, they offer significant ways of tangibly improving the quality of life.

° An automobile owner discovers her car missing from the parking garage and because the system has instant activation and a hidden antenna not known to the thief, the police are able to recover the vehicle quickly and before substantial damage to it has occurred.

° In a car equipped with MobileVision's emergency roadside service package, a teenager lost or broken down at night is precisely located virtually instantly, without unlocking a door or leaving the vehicle.

° A cab driver assaulted by a passenger summons immediate help from police, using a MAYDAY unit; or, unable to locate an address where he is to pick up an elderly customer, is promptly directed to his destination and simultaneously calls the waiting fare with an estimated arrival time.

° A passenger having a heart attack in a private car or on a city bus is located precisely and receives emergency medical treatment.

° A fleet of snow plows is monitored by a state highway department so that plows can be dispatched to areas of greatest need.

° A long haul trucker carrying valuable cargo is tracked throughout his trip to monitor the security of the shipment. Arriving at his destination in a high crime section of a major city he is confronted by a warehouse with 38 delivery bays. He contacts the warehouse superintendent from his truck and is quickly directed to his drop off point.

Thousands of such incidents and others that require both location and simultaneous and reliable communications occur every day, throughout the country. In each scenario, location finding by the LMS provider is the central function for which the LMS unit is used. However, in several of them, the availability of ancillary voice and data communications is critical -- to the lost teenager, to the cab driver and his waiting fare, to the heart attack victim, and to the truck driver.[5] LMS represents the single most versatile,

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5 In connection with the need to recognize those capabilities as an integral part of LMS service, MobileVision recommends that the following definition of LMS be incorporated in the final rules:

"The use of non-voice signalling methods from and to radio units to make known the location of such units. LMS systems may also transmit and

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highly-efficient, low cost solution to these practical real world problems. The Commission's objective in this proceeding must be to guarantee by the rules it adopts that the public will have the benefit of such services, now.

Since the filing of the last formal pleadings in this proceeding in July, 1993, numerous parties have met on an ex parte basis with the Commission and various of its Bureaus and staff members, espousing various viewpoints. In the intervening seven months, the focus of attention has drifted far afield of the principal objective set forth in the NPRM, i.e., to "propose rules that will promote the efficient operation and continuing growth of [LMS]." (NPRM, ¶1). Issues that are peripherally related, at best, have come prominently, if not inappropriately, into play.

MobileVision is gravely concerned that shifting the focus of this proceeding could result in the adoption of rules that are directly contrary to the public benefit of establishing a truly competitive environment in which users of LMS have the opportunity to avail themselves of valuable, diverse and innovative new services which advance crucial public safety needs, assure greater protection of life and personal property, and advance national productivity and the goals of IVHS. If such rules are adopted, MobileVision believes that the restraint on services and lack of capacity will foreclose market entry and frustrate the purposes of LMS and its role in advancing the general welfare and the specific objectives of IVHS, forever.

This concern has been heightened by the Teletrac Submission. Particularly disturbing about Teletrac's proposal is that it contemplates a single shared 10 MHz band. This radical departure from the Interim Rules would compromise the viability, capability

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receive ancillary voice and non-voice communications to and from the units being located."

and accuracy of systems developed under those rules as well as their promise of bringing valuable new services to the marketplace. As set forth below, Teletrac's Submission is directly contrary to all of its submissions to the Commission for almost two years. As presented, it is technically unfounded, lacks proper engineering and scientific analysis and would, if adopted, leave Teletrac in a monopoly position for wideband LMS in the proposed allocated bandwidth.

In addition, MobileVision's concerns arise from its own ex parte communications with PRB staff regarding the technical parameters of LMS systems in general and the requirements for economic viability of such systems if they are to competitively provide location services desired by the public.

In responding with these Further Comments pursuant to the Commission's Notice, MobileVision first restates briefly the background in this proceeding and the specific needs that must be met in permanent rules issued by the Commission if the public is to receive the benefits of LMS systems. MobileVision then addresses the recent submissions of Teletrac, Southwestern Bell, and Pinpoint.

Finally, MobileVision offers its own suggestions as to methods and requirements that could be adopted to meet the legitimate needs of LMS providers and the understandable concerns of the narrowband providers and Part 15 users. These proposals will include not only the minor changes in bandwidth allocation and related matters described above but introduce a specific method by which permanent rules can establish the priority of wideband LMS licensees on the same bandwidth and recommend mandatory reselling of system capacity to increase potential competition.

MobileVision believes the record in this proceeding fully supports the maintenance of the allocation scheme of the Interim Rules in existence for 20 years, with addition of MobileVision's modest suggested changes. Clearly, the record does not

contain clear evidence that would support the adoption of any other proposal. Nor do LMS narrowband providers or Part 15 providers and others who have been governed by these Interim Rules for that time have reason to object to a playing field that continues their sound principles and recognizes rightful reliance on them during that period.

BACKGROUND OF THE PROCEEDING

As noted above, almost two years after the filing of a Petition for Rulemaking by Teletrac ("Teletrac's Petition"), the issues once clearly presented for comment in the Commission's Notice of Proposed Rule Making ("NPRM") have now become clouded. In that intervening period, the purpose and goals of the NPRM issued in response to legitimate concerns expressed in Teletrac's Petition for permanent rules seem to be lost in the divergent comments and ex parte submissions filed by the varied interest groups who claim to be affected by this proceeding. With the recent Teletrac Submission, contradiction and confusion in the record now reign supreme. MobileVision hopes by these Further Comments to return the focus of this proceeding to its central issues, issues critical to providing LMS services to the public and integrating them within the IVHS of the future.

LMS (originally called AVM) developed pursuant to a grant of license rights dating back to 1974 when the Commission issued a Report and Order, following extensive fact gathering, resulting in the Interim Rules. These Interim Rules set the parameters under which pioneers in the field, such as MobileVision, were licensed and developed their systems. Though technically sound in many respects,[6] these Interim Rules did suffer from

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6 The Interim Rules recognized the need for 8 MHz bandwidth to assure LMS providers would have the capacity and accuracy required for a viable system, and the requirement for separation of wideband and narrowband systems. The evidence

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some deficiencies, one of which was their continued denomination, in spite of their existence for almost twenty years, as Interim.

On May 26, 1992, Teletrac petitioned the Commission to establish permanent rules to address the inadequacies of the Interim Rules.[7] Most significantly, Teletrac indicated that

> "Without permanent rules that minimize the interference generated by co-channel [LMS] systems operating in this band, the scarce spectrum available for this service increasingly will be used inefficiently." (Teletrac's Petition, p. 2).

Teletrac emphasized that "it is essential that permanent new rules retain the [two] 8 MHz wide frequency plan [of the Interim Rules]. (Teletrac's Petition, p. 21). Teletrac submitted that "co-channel separation," the licensing of one wideband LMS provider for each 8 MHz band per market, was necessary "in order to maximize system capacity, protect service quality and encourage development of future services." (Teletrac's Petition, p. 24). In support of its proposal, Teletrac also demonstrated that the 1974 Report and Order reflected "the need for geographic separation of co-channel AVM systems" and anticipated only two wideband providers per market. (Teletrac's Petition, p. 27).

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presented in the 1974 proceeding and the resulting Order also made it clear that only two systems would be able to be accommodated, each on its own band, in each geographic area. For a detailed history of the 1974 proceeding, see Appendix 5 to Teletrac's Comments in this proceeding filed on June 29, 1993.

7 The deficiencies noted by Teletrac in the Interim Rules included (1) the lack of modern technical specifications and equipment authorization procedures; (2) the lack of rules to minimize interference between co-channel, wideband pulse-ranging AVM systems; (3) the lack of a standardized frequency for a forward link; (4) the limitation that only vehicles could be located; and (5) the fact that Interim Rules, by their very nature, discourage large scale investment. Teletrac's Petition, pp. 16-17.

MobileVision submitted comments generally in support of Teletrac's Petition, and specifically supported the need for interference protection through co-channel separation.

In the NPRM, the Commission noted that AVM systems "now operating under interim rule provisions adopted in 1974, will likely constitute important components of the future Intelligent Vehicle Highway System . . ." (NPRM, ¶1). For the purpose of adopting permanent provisions that would further the public benefit in this regard, the Commission invited comments on the following central issues:

> (1) the Commission's proposals to expand service eligibility to individuals and the Federal Government and license eligibility to private carriers, and to broaden permissible uses to include location of animate and inanimate objects in addition to vehicles. (In doing so, the Commission restated, without request for comment, the ability of licensees to provide ancillary messages as set forth in the Interim Rules);[8]
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> (2) the Commission's proposals to maintain the allocation of wideband systems on two 8 MHz bands at 904-912 MHz and 918-926 MHz as provided in the Interim Rules and to allocate additional spectrum to narrowband systems, providing for such systems in the 902-904, 912-918 and 926-928 MHz bands (an increase of 6 MHz of allocated spectrum for such systems); and
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> (3) the Commission's alternative proposals, specifically premised on the assumption that sharing of the wideband spectrum is feasible, to either (a) require coordination among licensees to avoid interference if the record resulted in a determination by the Commission that "sharing is immediately feasible" (emphasis in original), or (b) protect the first two licensees in each market for five years and then place the burden on any new entrant to protect existing stations.

While MobileVision supported most of the proposals in the NPRM, it and Teletrac strongly objected to the proposal that spectrum should be shared by wideband systems through either channel coexistence or spectrum fragmentation. MobileVision still maintains that position. **The only information that has been presented in this**

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8 Consistent therewith, the NPRM proposes no restriction on the types of emission for LMS operation (NPRM, ¶ 29).

proceeding, based on actual experience with wideband pulse-ranging systems, establishes clearly that time sharing or frequency fragmentation results in loss of capacity, accuracy, required ancillary services and reliability. Such sharing, rather than increasing competition, would eventually render wideband LMS systems technically and economically nonviable.

Pinpoint supported shared frequency but argued for greater than 8 MHz bandwidth.[9] Southwestern Bell urged fragmentation of the 8 MHz wideband segments into four 4 MHz bands. (These licensing schemes are, notably, directly antithetical to each other.) Adoption of either of their proposals would require each of the other providers or proposed providers of wideband LMS service to fully redesign its system to meet their unique system design requirements. MobileVision, which has developed its system at great expense, under the existing rules, is ready to deploy its system and offer customer service now.

DISCUSSION

I. THE COMMISSION SHOULD EVALUATE THE RECORD IN LIGHT OF ITS OBJECTIVE OF ADOPTING RULES THAT PROMOTE LMS SERVICES AND CONTRIBUTE TO THE NATIONAL DEPLOYMENT OF IVHS

The Commission has already noted the importance of LMS systems within the national goal of developing IVHS. As set forth in the NPRM, "[t]hese systems, which are now operating under interim rule provisions adopted in 1974, will likely constitute important components of the future Intelligent Vehicle Highway System and tracking of cargo in the

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9 The practical deficiencies of time sharing are detailed in technical report attached as Annex 3 and have been thoroughly discussed in prior MobileVision filings and Southwestern Bell filings, including its latest submission.

trucking, railroad and maritime industry." (NPRM, ¶ 1) Congress has set IVHS as a national priority and authorized $660 million for the first phase of its accomplishment.

The goals for IVHS are ambitious and a broad array of services are required to meet them. Many functional areas of IVHS, such as Advance Traveler Information Systems ("ATIS") and Commercial Vehicle Operations ("CVO"), require unrestricted voice and high speed data capability to meet service needs. Attached as Annex 1 is a description of IVHS systems proposed by IVHS America, which has been commissioned by the Department of Transportation to design the needs of this important national goal. IVHS America has succinctly described how those systems must develop.

> "For the consumer, IVHS will provide products and services that will save time and make travel more convenient, safer, or quicker. However, it would be a mistake to forget that the consumer is principally concerned with the personal benefits of a technology, not with issues of integration, standards or possible social benefits. In the end, the consumers will determine the fate of IVHS by voting with their dollars. This suggests the need for very careful attention to human factors in the design of IVHS hardware and software and functionality. Public agencies, which will buy a substantial amount of IVHS hardware, software, and systems are crucial customers as well." [Emphasis added.] [10]

Market studies have repeatedly shown that those "human factors" will dictate the need for immediately available voice and data in the IVHS services. The Annex 1 sets forth the role that LMS will play in the development of IVHS. However, LMS systems will not further the goals of IVHS unless they are capable of offering ancillary voice and data services, with sufficient capacity to serve the broad marketplace that will require them.

Any rules adopted by the Commission for LMS should foster the national IVHS goals by continuing the basic regulatory scheme of the Interim Rules with regard to 8 MHz bandwidth allocations, and providing an operating environment for LMS systems that does

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10 Strategic Plan for Intelligent Vehicle-Highway Systems in the United States, IVHS America, Report No: IVHS Amer-92-3, May 20, 1992.

not undermine their economic viability (either by failing to provide sufficient protection against interference to assure satisfactory accuracy, or by failing to recognize the need to offer broad services in order to achieve public acceptance, or by failing to assure that systems have sufficient capacity to permit competitive pricing of the service). To do otherwise would be counter to the overriding objectives of IVHS.

II. PERMANENT RULES MUST RECOGNIZE THE ECONOMIC REALITIES THAT AFFECT THE VIABILITY OF WIDEBAND LMS SYSTEMS

The adoption of permanent rules will not advance the availability of LMS services as intended if they do not allow those systems to operate on an economically viable basis. Conversely, LMS systems must be permitted to provide the public with access to the broadest capability of these systems, including adequate ancillary voice and data transmission capacity, if the national goals associated with information flow and IVHS are to be adequately met.

MobileVision has previously addressed the need for these capabilities and the market demand for them, as well as the need for systems to provide such communications if LMS systems are to be economically viable. In its ex parte submission on October 20, 1993 (copies of which were filed with the Commission), MobileVision described market studies that clearly indicated minimal market penetration without ancillary voice and data capability. Prospective national accounts customers (automobile manufacturers and national automobile clubs, for example) have been clear and unanimous in setting a requirement for associated voice and data functions. Market studies for commercial services show unacceptable market penetration where voice and data messaging capability is absent. They show penetration growing by five times over

location-service-only when associated voice capability is among the optional service offerings.

Voice and data capability alone will not be sufficient to create viable systems unless such systems have enough capacity to serve the mass market[11] at affordable costs. The infrastructure costs for non-cellular entrants in the wideband LMS market are substantial, as much as $6-8 million in any given market. Operating costs also are substantial and are similar for all LMS systems (rental costs, telephone charges for backhaul service, etc.). Since it is expected that the per user cost must be maintained at or under $10 per month, these systems will only succeed with hundreds of thousands of users. High volume requirements mean that the existing 8 MHz bandwidth must be preserved and that operations on that bandwidth remain unshared in order to handle peak demands.

It is important to emphasize that LMS systems, however, are not designed and will not compete with cellular systems or other technologies, such as Personal Communications Services ("PCS"), where voice, not location, is the primary service. Even if voice and data services are provided on an unrestricted basis to support IVHS goals and LMS market needs, LMS systems do not have the capacity to compete with cellular systems and such services will remain ancillary to the primary service of location. However, when the primary requirement of a licensed service is location and IVHS related, providers of that service should not be placed at a competitive disadvantage to other providers, such as cellular and PCS, whose services, linked with global positioning satellites ("GPS") or with other location systems, possess or will possess those needing

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11 Automobile manufacturers' plans include providing location service units as standard equipment in millions of cars annually. Similarly, MobileVision's accounts in Chicago include a major national automobile club that requires ancillary voice and data.

voice and data capabilities. For example, automobile manufacturers have already advised that in the absence of such ancillary services, a GPS system coupled with cellular service is the only method to meet their needs. Since many consumers will not subscribe to the higher cost cellular systems, a large segment of the public would thus be deprived of valuable, innovative, even life-preserving services for lack of a competitive lower cost alternative. Such customers should and must decide when that secondary capability should be used in conjunction with location services.

III. PERMANENT RULES SHOULD NOT REQUIRE SHARING BUT SHOULD FOSTER THE DEPLOYMENT OF CURRENTLY AVAILABLE LMS SYSTEMS BY ASSURING PROTECTION FROM INTERFERENCE

While service providers must be assured of the ability to provide adequate capacity for the economic success of their systems, customers demand maximum accuracy and dependability in the system to which they subscribe. Accuracy and dependability are direct functions of interference in the electromagnetic environment. MobileVision's initial comments in this proceeding describe the technological means by which wideband pulse-ranging spread spectrum systems operate, the impact of interference on the operation of such systems, and the sources of such interference. They included a Technical Appendix detailing the basis for the statements made. Those comments, as well as those filed by Teletrac (with accompanying expert affidavits), Location Services (the third licensee for wideband services) and Southwestern Bell, were all unanimous in the position that the interference generated by two wideband systems

operating on the same frequency in the same area would eventually render the band useless within that area.[12]

IV. WITHOUT PROTECTION FROM INTERFERENCE AS WELL AS SUFFICIENT CAPACITY AND SERVICE OFFERINGS, NON-CELLULAR LMS PROVIDERS WILL NOT BE ABLE TO COMPETE IN OFFERING LOCATION SERVICES

Any rules adopted in this rulemaking should be designed to provide competitive location services to the public now. True competition for location services from the user's viewpoint is not defined by how many wideband pulse ranging licensees are operating in a geographical marketplace but rather by how many alternative (and to some extent substitutable) technologies exist in a geographical marketplace that are commercially viable and offer valuable services subject to price and service competition.

The Commission's objective is, MobileVision believes, to offer users the widest array of location capable services, with different ranges of capability at different cost bases. Today, that range includes GPS, low earth orbiting satellites, tag readers and wideband pulse ranging systems. Cellular, SMR, other wireless services, and in the future

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12 The basic principles set forth in those submissions are as follows: a certain amount of interference can be tolerated by a wideband system consistent with its jamming margin, but above that interference tolerance, an emission by another source on the same frequency would cause the signal of the wideband system either to be lost or its time of arrival to be distorted. The result, in either case, is a loss of accuracy in the location function. The wideband system commenters were unanimous -- but for one -- that techniques that permit shared spectrum for communication purposes, such as TDMA, are not suitable for location services.

Teletrac provided the expert opinion of Dr. Raymond Pickholtz in this regard. See Engineering Analysis of Prof. Raymond Pickholtz, Appendix 1 to Teletrac Comments ("Pickholtz Statement"), pp. 27-33. The following initial comments demonstrated that existence of two sets of pulse-ranging wideband signals will cause either the loss of those signals, or invalidate the time-of-arrival measurements of the signals, and, thus, frustrate the location ability of both systems. MobileVision Comments at pp. 33-34 and Technical Appendix at pp. 10-17; Location Services Comments at p. 4; Teletrac Comments at pp. 24-46; Pickholtz Statement at p. 12.